

REVISED VERSION

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
3 June 2004 (03.06.2004)

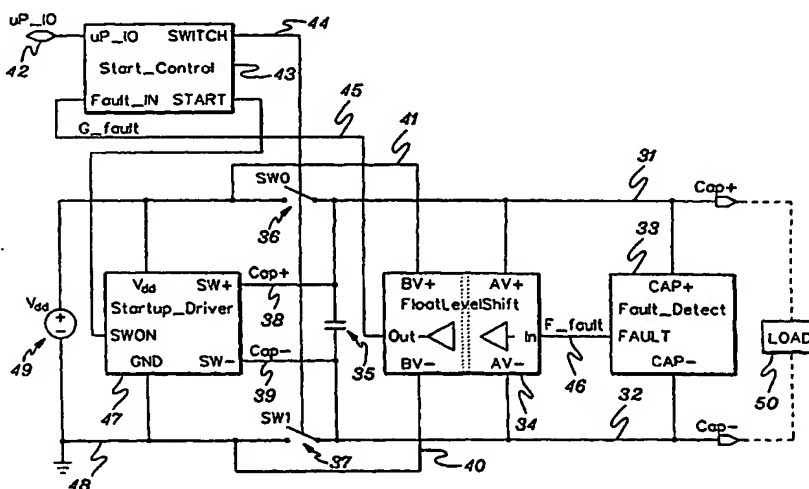
PCT

(10) International Publication Number  
**WO 2004/047303 A1**

- (51) International Patent Classification<sup>7</sup>: **H02M 3/07**
- (21) International Application Number:  
PCT/IB2003/005184
- (22) International Filing Date:  
15 November 2003 (15.11.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/427,633 18 November 2002 (18.11.2002) US  
10/607,749 27 June 2003 (27.06.2003) US
- (71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]**; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **DONALDSON, William [GB/US]**; 1109 McKay Drive, M/S-41SJ, San Jose, CA 95131 (US). **TOY, Edmond [US/US]**; 1109 McKay Drive, M/S-41SJ, San Jose, CA 95131 (US).
- (54) Common Representative: **KONINKLIJKE PHILIPS ELECTRONICS N.V.**; c/o LESTER, Shannon, 1109 McKay Drive, M/S-41SJ, San Jose, CA 95131 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Declaration under Rule 4.17:  
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,

[Continued on next page]

(54) Title: PROTECTION CIRCUIT AND METHOD FOR FLOATING POWER TRANSFER DEVICE



(57) Abstract: A protection circuit and method are provided for a floating power transfer device having one or more switches for controlling charging of a reservoir capacitor across which a load is applied when in use. The protection circuit includes a control circuit (43), a fault detection circuit (33) and a precharge driver circuit (47). The control circuit (43) at least partially controls switching of the at least one switch, while the fault detection circuit (33) detects when a fault in the floating power transfer device or the load occurs and sends a fault detect signal to the control circuit (43) in response thereto. The precharge driver circuit (47), which is enabled by the control circuit (43) responsive to receipt of the fault detect signal, attempts to precharge the reservoir capacitor (35) to a voltage level sufficient for switching of the one or more switches (36, 37) to proceed without damaging the switches (36, 37).

WO 2004/047303 A1



CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

**Published:**

— with international search report

(88) Date of publication of the revised international search report: 24 June 2004

**(15) Information about Correction:**

see PCT Gazette No. 26/2004 of 24 June 2004, Section II

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

REVISED  
VERSION

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 03/05184

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H02M3/07

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 257 810 A (PLESSEY OVERSEAS) 2 March 1988 (1988-03-02) column 5, line 36 - column 6, line 28; figures 4,5	1-19
A	US 2002/008499 A1 (HENRY GEORGE C) 24 January 2002 (2002-01-24) column 5, paragraph 77 - column 6, paragraph 81; figures 4-6	1-19
A	DE 100 45 693 A (INFINEON TECHNOLOGIES AG) 4 April 2002 (2002-04-04) abstract; figure 1	
A	EP 1 065 784 A (TEXAS INSTRUMENTS DEUTSCHLAND) 3 January 2001 (2001-01-03) abstract; figure 1	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the International filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the International filing date but later than the priority date claimed

"T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"a" document member of the same patent family

Date of the actual completion of the international search

12 May 2004

Date of mailing of the International search report

17 MAR 2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl  
Fax: (+31-70) 340-3018

Authorized officer

Segaert, P

## INTERNATIONAL SEARCH REPORT

PCT/03/05184

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0257810	A	02-03-1988	GB	2193392 A	03-02-1988
			EP	0257810 A2	02-03-1988
			JP	63114566 A	19-05-1988
<hr/>					
US 2002008499	A1	24-01-2002	US	2003169097 A1	11-09-2003
			US	2002008567 A1	24-01-2002
			US	2002027467 A1	07-03-2002
<hr/>					
DE 10045693	A	04-04-2002	DE	10045693 A1	04-04-2002
			WO	0223706 A1	21-03-2002
			EP	1317793 A1	11-06-2003
<hr/>					
EP 1065784	A	03-01-2001	DE	19928309 A1	04-01-2001
			EP	1065784 A1	03-01-2001
			US	6226194 B1	01-05-2001
<hr/>					